

ABSTRACT OF THE DISCLOSURE

Disclosed are organometallic compounds derived from Groups VIIb, VIII, IX, and X metals useful as precursors for the formation of metal containing powders and for the chemical deposition of the metals on substrates, particularly for the chemical vapor deposition of metal films suitable for the manufacture of electronic devices. Methods for their use are also disclosed. The preferred organometallic compounds of the present invention are of the formula $(R^1)_mM(PR^2_3)_x$, where M is a metal selected from the group consisting of manganese, technetium, rhenium, iron, cobalt, nickel, ruthenium, rhodium, palladium, osmium iridium and platinum wherein m is 0, 1, 2, 3 or 4; x is 2, 3, 4 or 5 and m + x are 2, 3, 4, 5, 6, 7 or 8, m and x selected according to each metals appropriate valence; each R^1 is independently selected from the group consisting of hydrogen, deuterium, N_2 , H_2 , D_2 and a variety of substituted alkyl groups; each R^2 is independently selected from the group consisting of lower alkyl, aryl, arylalkyl, and alkyl-Z, aryl-Z and arylalkyl-Z where Z is selected from the group consisting of oxy, silyl, siloxy, oxysilyl, siloxy, oxysiloxy, silyalkyl, oxysilylalkyl, siloxyalkyl, oxysiloxyalkyl, silylalkoxy, silylalkoxy, siloxyalkoxy and oxysiloxyalkoxy; and wherein when M is cobalt and one group R^1 is selected to be N_2 , then m is 2 and the second group R^1 is hydrogen or deuterium.